AMENDMENTS TO THE CLAIMS

Please amend the claims as indicated in the following listing of all claims:

1. (Currently amended) A method of building a multi-layer graph for greater than two dimensional integrated circuit routing, the method comprising:

generating a plurality of subgraphs, wherein individual ones of the plurality of subgraphs correspond to respective ones of a plurality of layers of circuitry, ~~respective ones of the plurality of~~ the individual subgraphs including a plurality of segments based on information from other layers of circuitry; and

combining the plurality of subgraphs into a single, multi-layer graph.

2. (Previously Presented) The method of claim 1 wherein the information from the other layers of circuitry includes segments from the other layers and intersection points of the segments from the other layers.

3. (Original) The method of claim 1 wherein the generating the plurality of subgraphs comprises the following steps:

generating a first set to include a plurality of graph segments having a first orientation from a first layer and from any other layers disposed in a first direction from the first layer;

inserting in the first set a plurality of graph segments having the first orientation from any other layers disposed in a second direction from the first layer;

generating a second set to include a plurality of graph segments having a second orientation from the first layer and any other layers disposed in a first direction from the first layer; and

inserting in the second set a plurality of graph segments having the second orientation from any other layers disposed in a fourth direction from the first layer.

4. (Previously Presented) The method of claim 3 further comprising generating the first and second sets for individual ones of the plurality of layers of circuitry.

5. (Original) The method of claim 3 wherein the generating the plurality of subgraphs further comprises generating a third set, the third set including intersection points of graph segments in the first and second sets, and minimal segments from the first and second sets.

6. (Original) The method of claim 5 further comprising the step of providing a subgraph including the intersection points as nodes of the subgraph and the minimal segments as edges between the nodes.

7. (Original) The method recited in claim 3 wherein the first and second orientations are substantially orthogonal.

8. (Original) The method recited in claim 3 wherein the first and third directions are substantially identical to each other and substantially orthogonal to the first layer, and the second and fourth directions are substantially identical to each other and substantially opposite to the first and third directions.

9. (Original) The method recited in claim 3 wherein the generating the first set comprises:

recording first information regarding locations of each successive intersection with elements in a first layer while proceeding from a first edge of the first layer to a second edge of the first layer; and

adding second information regarding coverage of the locations by elements of other layers.

10. (Original) The method recited in claim 9 wherein the first information includes a plurality of points at intersections of a sweep line and obstacle edges.

11. (Previously Presented) The method recited in claim 9 wherein the second information includes a marking of individual ones of the plurality of points indicating possible coverage of the points by elements in other layers disposed in the first direction from the first layer.

12. (Original) The method recited in claim 9 wherein the adding of the second information occurs substantially concurrently with the recording of the first information.

13. (Original) The method recited in claim 9 wherein the generating the first set further comprises creating vertical graph segments based on the first and second information.

14. (Original) An integrated circuit made by a process including the steps of claim 1.

15. (Previously Presented) A method of routing through a route space including a plurality of route layers, the method comprising the steps of:

generating a subgraph corresponding to a routing layer and including a plurality of route segments based on information from the corresponding routing layer and a plurality of route segments based on information from other routing layers; and

generating a multi-layer route graph, the multi-layer route graph based at least in part on the subgraph.

16. (Currently amended) A product for receiving routing data regarding a multi-layer routing problem and for generating a multi-layer graph to facilitate resolution of the routing problem, the product comprising:

a first module for generating a plurality of subgraphs, wherein individual ones of the plurality of subgraphs correspond to respective ones of a plurality of layers of the routing data, ~~respective ones of the plurality of~~ the individual subgraphs including a plurality of segments based on information from other layers of the routing data; and

a second module for combining the plurality of subgraphs into a single, multi-layer graph.

17. (Previously Presented) The product of claim 16 wherein the first module includes instructions for recording information regarding segments from the other layers and intersection points of the segments from the other layers.

18. (Original) The product of claim 16 wherein the first module is a software module and comprises:

at least one instruction for generating a first set to include a plurality of graph segments having a first orientation from a first layer and from any other layers disposed in a first direction from the first layer;

at least one instruction for inserting in the first set a plurality of graph segments having the first orientation from any other layers disposed in a second direction from the first layer;

at least one instruction for generating a second set to include a plurality of graph segments having a second orientation from the first layer and any other layers disposed in a first direction from the first layer; and

at least one instruction for inserting in the second set a plurality of graph segments having the second orientation from any other layers disposed in a fourth direction from the first layer.

19. (Original) The product of claim 18 wherein the first module further comprises at least one instruction for generating a third set, the third set including intersection points of graph segments in the first and second sets, and minimal segments from the first and second sets.

20. (Original) The product recited in claim 18 wherein the first and second orientations are substantially orthogonal.

21. (Original) The product recited in claim 18 wherein the first and third directions are substantially identical to each other and substantially orthogonal to the first layer, and the second and fourth directions are substantially identical to each other and substantially opposite to the first and third directions.

22. (Original) The product recited in claim 18 wherein the at least one instruction for generating the first set comprises:

at least one instruction for recording first information regarding locations of each successive intersection with elements in a first layer while proceeding from a first edge of the first layer to a second edge of the first layer; and

at least one instruction for adding second information regarding coverage of the locations by elements of other layers.

23. (Original) The product of claim 16 wherein

the product comprises a computer program product encoded in at least one computer readable medium;

the modules are software modules for processing information for generating the multi-layer graph; and

the at least one computer readable medium comprises at least one of the group consisting of a data storage medium and a data transmission medium, wherein the data storage medium includes at least one of the group consisting of a magnetic disk, an optical disc and a tape, and the data transmission medium includes at least one of the group consisting of the Internet, a wireline network and a wireless network.

24. (Original) A 2.5-D graph for use in multi-layer, integrated circuit routing, the graph comprising:

a first subgraph corresponding to a first circuit layer, the first subgraph including a set of routing segments selected using information from the first circuit layer and at least one other circuit layer; and

a second subgraph corresponding to a second circuit layer, the second subgraph including a set of routing segments selected using information from the second circuit layer and at least one other circuit layer.

25. (Previously Presented) The graph of claim 24, wherein the graph is embodied in computer readable descriptive form suitable for use in design, test, or fabrication of the integrated circuit.

26. (Previously Presented) The method of claim 15, wherein the information from the other routing layers includes segments from the other layers and intersection points of the segments from the other layers.

27. (Previously Presented) The method of claim 15, wherein the generating the subgraph comprises the following steps:

generating a first set to include a plurality of graph segments having a first orientation from a first layer and from any other layers disposed in a first direction from the first layer;

inserting in the first set a plurality of graph segments having the first orientation from any other layers disposed in a second direction from the first layer;

generating a second set to include a plurality of graph segments having a second orientation from the first layer and any other layers disposed in a first direction from the first layer; and

inserting in the second set a plurality of graph segments having the second orientation from any other layers disposed in a fourth direction from the first layer.

28. (Previously Presented) The method of claim 27 wherein the generating the subgraph further comprises generating a third set, the third set including intersection points of graph segments in the first and second sets, and minimal segments from the first and second sets.

29. (Previously Presented) The method of claim 27 wherein the generating the first set comprises:

recording first information regarding locations of each successive intersection with elements in a first layer while proceeding from a first edge of the first layer to a second edge of the first layer; and

adding second information regarding coverage of the locations by elements of other layers.